LINCOLN FIRE DEPARTMENT

Bill Smull
Chief of Police
Fire Administrator
770 7th Street
Lincoln, CA 95648
Phone (916) 645-4040
Fax (916) 645-8940

FIRE PREVENTION STANDARD 04-01

Subject: Automatic Fire Sprinkler Systems

OBJECTIVE

To insure that sprinkler plans submitted for review contain items necessary for approval prior to installation of systems in accordance with the latest edition of N.F.P.A. 13, *Standard for the Installation of Sprinkler Systems* in any structure. To provide a satisfactory level of life and property safety from fire considering the unique features of Lincoln and the requirements of the Lincoln Fire Department. All reference to N.F.P.A. 13, *Standard for the Installation of Sprinkler Systems* is to the 1999 edition unless otherwise noted.

This Policy applies to all new or modified sprinkler systems in accordance with the 1999 edition of N.F.P.A. 13, *Standard for the Installation of Sprinkler Systems*. All individuals and companies who propose to engage in the installation or alteration of fire sprinkler systems are subject to the requirements of this policy and all other requirements of N.F.P.A. 13, *Standard for the Installation of Sprinkler Systems*.

This Policy outlines the procedure to be followed when submitting sprinkler plans and defines the Departments requirements for sprinkler system installations that may be more restrictive or not included in existing codes and standards.

PROCEDURE

Procedures are numbered in accordance with N.F.P.A. 13 chapters. Chapter numbers missing from this document indicate direct application of that chapter of N.F.P.A. 13, *Standard for the Installation of Sprinkler Systems*, 1999 edition.

Part One – Commercial Occupancies:

Chapter 3-3 – Aboveground Pipe and Tube

1. Sprinkler piping shall meet the minimum requirements of N.F.P.A. 13, *Standard for the Installation of Sprinkler Systems*, Table, 3-3.1 and shall be UL listed and FM approved. All pipes shall have a Corrosion Resistance Ratio (CRR) of 1.00 or greater per the UL listing and FM approval. Other types of pipe material may be approved for use provided they meet appropriate UL listing, FM approval and

Bill Smull
Chief of Police
Fire Administrator
770 7th Street
Lincoln, CA 95648
Phone (916) 645-4040
Fax (916) 645-8940

N.F.P.A. 13, *Standard for the Installation of Sprinkler Systems* criteria. The fire department must approve the use of alternate pipe prior to installation.

2. Easy-Drop® and Flex-Head® type devices are not currently approved.

3. Crossed-linked polyethylene (PEX) pipe and tubing products are not currently approved.

Chapter 3-8 - Valves

1. The inspectors test valve and discharge shall be located remote from the sprinkler system riser.

Chapter 3-9 and 5-15 - Fire Department Connections

1. Fire department connections shall be visible, accessible, and installed on the address side of buildings in approved locations, and provided with metal caps.

2. Fire department connections shall be located within 40 feet of an accessible fire hydrant.

   Exception: In special circumstances the Chief may allow greater distance, but in no case more than 150 feet.

3. The fire department connection shall be a minimum of 40 feet from openings in the building served. The fire department connection shall not be located on a new building.

4. Fire department connections shall be within 2 feet of the curb or back of walkways adjacent to a public street or approved fire access lane. When a back-flow device is used the fire department connection shall be located on the system side of the back-flow device within 15 feet of, and face the public street or fire access lane. Fire department connections shall be located free of interference from nearby objects including buildings, fences, posts, trees, etc., and in regard to overhead hazards such as transformers or transmission lines.

5. The fire department connection shall serve only one building.

   Exception: Mini-storage facilities located on one parcel may be served by one fire department connection.

Bill Smull
Chief of Police
Fire Administrator
770 7th Street
Lincoln, CA 95648
Phone (916) 645-4040
Fax (916) 645-8940

6. Address numbers are required to indicate area or building served by the fire department connection. The address numbers shall be 2 inch black numbers on a white reflective background and be located on the "mud leg" of the fire department connection facing the public street or fire access lane.

7. Existing buildings that do not conform to #1 and #2 above shall require the installation of a new fire department connection in accordance with this standard when automatic sprinkler systems are upgraded with the addition of 20% or more fire sprinklers.

8. Sprinkler systems designed for a total combined water demand of 1,000 gallons per minute and over, determined by the sprinkler system and inside hose demand, shall be equipped with one 2½ inch inlet per each 500 gallons per minute on a fire department connection manifold with a minimum of a 6 inch pipe and check valve.

9. Fire department connections shall be installed in a manner approved by the fire department and the local water purveyor.

Chapter 4-3 - Pre-Action Systems and Deluge Systems

1. Pre-action systems are not approved for office spaces. Pre-action systems shall default to a wet pipe system in the event of alarm system failure.

   Exception: Normally unoccupied computer rooms constructed in accordance with N.F.P.A. Standard 75, *Standard for the Protection of Information Technology Equipment*.

Chapter 5-4 - Residential Systems

1. Hotels, Motels, Condominium and Apartment buildings shall be protected with sprinkler systems designed and installed in accordance with NFPA 13, *Standard for the Installation of Sprinkler Systems.*

Chapter 5-5 - Position, Location, Spacing and Use of Sprinklers

1. Sprinklers shall not be placed in or below smoke vents or ridge vents.

Bill Smull
Chief of Police
Fire Administrator
770 7th Street
Lincoln, CA 95648
Phone (916) 645-4040
Fax (916) 645-8940

Chapter 5-13 - Special Situations

1. Hoppers inside buildings or outside of the building but within 10 feet of combustible walls for the collection of dust and particles shall be protected with automatic fire sprinklers. This system shall be designed per NFPA 13, *Standard for the Installation of Sprinkler Systems* extra hazard occupancy. This system shall have a separate monitored control valve and drain. Sprinklers shall be installed in ducts 12 inches or greater in width and over 10 feet in length. These sprinklers shall be of the "Picker Trunk" type, with 10' spacing if the diameter of the duct exceeds 24", if the diameter of the ducts is 12" to 24" spacing shall be 8'3".

   Exception: When approved, fixed automatic fire protection systems are permitted in-lieu of automatic fire sprinklers in exposed ducts.

2. Areas under computer room floors shall have automatic fire protection systems installed if wire or cable is to be installed within that space. Systems may be fire sprinklers, clean agent systems, carbon dioxide systems, Halon systems, or similar automatic extinguishment systems.

   Exception: Spaces in which all wire and cable is concealed within conduit, covered non-combustible troughs, or non-combustible covered cable trays, however, a smoke detection system is required in accordance with N.F.P.A. 75, *Standard for the Protection of Information Technology Equipment,* section 6-2.

3. Attic spaces and areas above ceilings shall have automatic fire sprinkler protection.

   Exception: Sprinklers may be omitted under any of the follow conditions:

   A. Non-combustible spaces containing materials reported as passing ASTM E 136, *Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750ºC.*

   B. Spaces in which all wire and cable is concealed within conduit, covered non-combustible troughs, or non-combustible covered cable trays.

4. Sprinklers shall not be installed at the tops of noncombustible hoistways of passenger elevators with car enclosure materials that meet the requirements of ASME A17.1, *Safety Code for Elevators and Escalators.*

Bill Smull
Chief of Police
Fire Administrator
770 7th Street
Lincoln, CA 95648
Phone (916) 645-4040
Fax (916) 645-8940

Chapter 5-14 - Piping Installation

1. System riser: In all new buildings the system riser shall be inside the fire control room constructed as follows:

   A. Fire control room shall contain all fire sprinkler system risers, fire alarm control panels, spare sprinklers and wrench, and other fire equipment required by the Chief.

   B. Fire control rooms shall be located within the building on an outside wall at a location approved by the Chief, and shall be provided with a means to access the room directly from the exterior with an approved door of minimum dimensions of 36"X80".

   C. Durable signage shall be provided on the exterior side of the access door to identify the fire control room. The sign shall indicate "FIRE CONTROL ROOM" with 3” letters that contrast with their background.

   D. A key shall be located within an approved high level Fire department Knox Company key box located adjacent to the access door on the exterior of the building at six feet above the finished floor.

   E. Fire control rooms shall have a minimum dimension of 5' and not be less than 35 square feet in usable area.

   F. The fire sprinkler riser shall be located on the outside wall between 12" and 18" from that outside wall and at least 12" from any other wall.

   G. The fire control room may contain other building service equipment. This other equipment shall not be within 3' in front of any fire equipment in the room.

   Exception: In all new apartment buildings the system riser shall be inside the fire control room constructed as follows:

   A. Fire control room shall contain all fire sprinkler system risers, fire alarm control panels, spare sprinklers and wrench, and other fire equipment required by the Chief.

Bill Smull
Chief of Police
Fire Administrator
770 7th Street
Lincoln, CA 95648
Phone (916) 645-4040
Fax (916) 645-8940

B. Fire control rooms shall be located within the building on an outside wall at a location approved by the Chief, and shall be provided with a means to access the room directly from the exterior with an approved door of minimum dimensions of 36"X80".

C. Durable signage shall be provided on the exterior side of the access door to identify the fire control room. The sign shall indicate "FIRE CONTROL ROOM" with 3” letters that contrast with their background.

D. A key shall be located within an approved high level Fire department Knox Company key box located adjacent to the access door on the exterior of the building at six feet above the finished floor.

E. The fire sprinkler riser shall be located on the outside wall between 12" and 18" from that outside wall and at least 12" from any other wall. The minimum square footage of 9 square with no dimension less than 3-feet.

F. The fire control room may contain other building service equipment. This other equipment shall not be within 3' in front of any fire equipment in the room.

2. System Control Valves

A. Control valves shall be an indicating type valve assembly. To comply with water quality requirements back flow protection shall be provided in accordance with local City of Lincoln Public Works Standards. For a single sprinkler system, if OS&Y valves are used on this back flow prevention device, and are located above ground, these valves may be approved for use as the exterior sprinkler control valve. Underground gate valves are not acceptable for sprinkler system control valves. All sprinkler system control valves shall be supervised with tamper switches that report to a central station alarm company and be locked in the fully open position with a non-hardened lock.

B. Multi-floor buildings (three or more stories): Individual floor control valves shall be required for each floor, located within a rated stairway. Floor control valves shall have a permanent sign identifying areas or systems controlled in ½” letters that contrast with their background and shall be permanently banded to the valve or permanently affixed to a wall adjacent to the valve.

C. Sprinkler systems located in special hazard areas (i.e. spray booths, trash chutes, flammable liquid storage, etc.) shall have a separate locked and monitored indicating control valve.

Bill Smull
Chief of Police
Fire Administrator
770 7th Street
Lincoln, CA 95648
Phone (916) 645-4040
Fax (916) 645-8940

Chapter 5-15 - System Attachments

1. An alarm bell shall be located adjacent to the fire sprinkler riser. Approved signs shall be legible and indicate, "SPRINKLER FIRE ALARM - CALL 911 IF RINGING" in accordance with N.F.P.A. 13, *Standard for the Installation of Sprinkler Systems*, Figure A-5-15.1.

2. Alarm bells shall provide a sound pressure level of a minimum 85db in accordance with UL Standard 464, *Audible Signal Appliances.*

3. Additional alarm needs for sprinkler systems.

   A. The water flow and tamper alarm system on a sprinkler system in a building is required to include the following items:

      1) A smoke detector above the fire alarm control panel in the fire control room.

      2) One audible/visual alarm visible on the street address side of the building.

      3) One manual-pull station and audio/visual annunciation device at a location normally occupied during business hours. In multi-occupant buildings these devices shall be in the occupancy nearest the fire sprinkler riser.

      4) Air handling duct smoke detectors for HVAC shutdown shall be monitored by this alarm system.

      5) This alarm will require a 24-hour battery test. It will not require UL certification.

      6) Any addition to this water flow and tamper alarm system will be considered a fire alarm system and be required to have a UL certificate.

   B. Multi story buildings (three or more stories) shall have the following devices at each floor in a rated stairway.

      1) Water flow switch.

      2) Monitored indicating floor control valves.

      3) Drain valve.

Bill Smull
Chief of Police
Fire Administrator
770 7th Street
Lincoln, CA 95648
Phone (916) 645-4040
Fax (916) 645-8940

4) Inspectors test valve with sight gauge remote from the system riser.

C. Multi story buildings (three or more stories) shall have a combination standpipe system installed per NFPA 14.

Chapter 5-16 Spray Application Using Flammable and Combustible Materials

1. Spray booths shall have a separate monitored control valve and drain.

2. For hydraulic purposes, calculations shall be based upon all sprinklers flowing simultaneously with density for an Extra Hazard Group 2 occupancy.

3. Sprinkler location:

   A. In the spray area and plenum areas.

   B. In exhaust stack 6" above building roofline.

   C. At the midpoint of offset ducts.

   D. In horizontal ducts or plenums a maximum of 10 feet on center and 5 feet maximum from duct bends.

4. Sprinklers outside the spray booth at the ceiling level should be high-temperature rated (286ºF).

Chapter 6-1 Hangers

1. Hanger installation shall be in accordance with the N.F.P.A 13, *Standard for the Installation of Sprinkler Systems*.

2. For all new sprinkler system installations, a completed copy of the *Structural Compliance Letter* (attachment 1) shall be provided upon plan submittal.

Chapter 6-4 Protection of Piping Against Damage Where Subject to Earthquakes

1. Seismic bracing installation shall be in accordance with the N.F.P.A 13, *Standard for the Installation of Sprinkler Systems*.

Bill Smull
Chief of Police
Fire Administrator
770 7th Street
Lincoln, CA 95648
Phone (916) 645-4040
Fax (916) 645-8940

2. For all new sprinkler system installations, a completed copy of the Structural Compliance Letter (attachment 1) shall be provided upon plan submittal.

Chapter 8 Plans and Calculations

1. Sprinkler plans for new installations, system upgrades, and partial systems shall be submitted to the City of Lincoln Building Department at 640 Fifth Street, Lincoln, CA 95648.

2. A minimum of two sets of plans shall be submitted with one set retained by the Fire Prevention Bureau and the other returned to the contractor with comments or corrections required. The returned set marked “Job Set” shall be maintained at the site where the work is being performed.

3. A C-16 license holder shall install all sprinkler systems. The licensed company or fire protection engineer shall prepare plans. License numbers shall be shown on all copies of plans.

   Exception: 13D sprinkler systems designed and installed in accordance with owner-builder provisions of the California Business and Professions Code, Section 7026.12. A signed copy of the *Home Owner Exemption Letter* (attachment 2) shall be provided upon plan submittal.

4. Installation shall not begin until plans have been approved. Additional fees will be charged for work started without approved plans.

5. All buildings requiring sprinkler protection shall have sprinklers throughout and no building may be partially protected with sprinklers without approval of the Fire Marshal.

6. Any exceptions used shall have prior approval and be noted on the submitted and approved plans.

Chapter 8-4 Hydraulic Calculation Procedures

1. All fire sprinkler plans shall be engineered to the results of a fire flow test from the nearest hydrant taken within the last 6 months and certified by water purveyor.
   Exception: Results provided by the water purveyor based on an approved water model.

Bill Smull
Chief of Police
Fire Administrator
770 7th Street
Lincoln, CA 95648
Phone (916) 645-4040
Fax (916) 645-8940

Chapter 9 Water Supplies

1. Underground piping shall be installed in accordance with N.F.P.A. 24, *Standard for the Installation of Private Fire Service Mains and Their Appurtenances* and with the approved plans prepared by a civil engineer or piping installation contractor. The underground fire service installation contractor shall submit for review and approval a schematic drawing showing part for part installation arrangement of the underground appurtenances and a parts list with listing information for all parts prior to installation. A trench section on detail shall be provided on the plans.

2. All runs of non-metallic water pipe, including services, shall have a No. 10 gauge solid soft drawn copper locator wire taped on top of the pipe to facilitate locating the pipe at a later date. The wire shall be stubbed up inside each valve box. Continuity test shall be conducted on each splice at all locations. A strand of 3" wide non-detectable blue tape marked "Water" shall be placed 12 inches above all main and service piping.
3. Above grade valves for controlling the water supply for on-site fire hydrants and automatic fire sprinkler systems shall be electrically supervised.

4. Plastic piping approved for underground installations shall be PVC, C900, Class 200 or greater, and be listed for such use. Galvanized pipe is not approved for underground supply piping.

5. Only ductile iron pipe shall be used within 5 feet of building foundations.
6. All piping shall be laid in a six inch (6") bed of sand or natural gravel not over one inch in diameter and have a twelve inch (12") fill of sand or natural gravel not over one inch in diameter.

7. All fasteners (nuts, bolts, etc.) shall be cleaned and coated with a bituminous corrosion retarding material after installation and prior to inspection. Fittings or fasteners shall not be wrapped or covered with plastic or covered with concrete.

8. Concrete thrust blocks or other approved retaining, shall be installed at all locations where piping changes direction.

9. A 200-PSI hydrostatic pressure test shall be performed on all installed piping and appurtenances for a period of two hours. The piping shall be center-loaded during pressure testing with all joints, fittings and appurtenances uncovered. Failure to comply with this section will result in the uncovering of the piping for visual inspection.

Bill Smull
Chief of Police
Fire Administrator
770 7th Street
Lincoln, CA 95648
Phone (916) 645-4040
Fax (916) 645-8940

10. A fire sprinkler system flush, using a full pipe diameter discharge, shall be conducted and witnessed by the fire department prior to connection to the above ground fire sprinkler system. The fire department connection piping shall also be flushed if connected to the fire sprinkler supply piping below grade. Piping shall be flushed until all foreign objects have been discharged and the water is clear.

Chapter 9-2 Fire Pumps

1. Fire pumps shall be installed in accordance with N.F.P.A 20, *Standard for the Installation of Stationary Fire Pumps for Fire Protection.*

2. A fire pump shall serve only one building.

3. A fire pump shall have a by-pass line installed.

4. If a test loop is provided, listed control valves with normally closed tamper switches shall be installed. In addition to the test loop, a method of flowing water every three years in accordance with N.F.P.A. 25, *Standard for the Inspection, Testing and Maintenance of Water-Based Fire Protection Systems* shall be provided.

Chapter 10 System Acceptance

1. Inspections: A new fire sprinkler system will normally require the following inspections per system riser or floor.

   A. One weld inspection. Required for all piping with welded outlets prior to being installed.

   B. One inspection for piping, seismic bracing, and hydrostatic testing.

   C. One final inspection including previously noted corrections. Completed copies of the contractor's material and test certificates for the underground and aboveground piping shall be provided.

Bill Smull
Chief of Police
Fire Administrator
770 7th Street
Lincoln, CA 95648
Phone (916) 645-4040
Fax (916) 645-8940

Part Two - One- and Two Family Dwellings and Manufactured Homes:

1. One and two family dwellings and manufactured homes may be protected with sprinkler systems designed and installed in accordance with NFPA 13D, *Standard for the Installation of Sprinkler Systems in One- and Two Family Dwellings and Manufactured Homes* and in accordance with City of Lincoln Residential Sprinkler Standard #04-02.

2. Modular buildings with residential sprinkler systems installed by the manufacturer will require hydraulic calculations to verify that the sprinkler demand at the base of the sprinkler riser can be provided. The hydraulic calculations shall be from the source to the point of connection to the building.

LINCOLN FIRE DEPARTMENT

Bill Smull
Chief of Police
Fire Administrator
770 7th Street
Lincoln, CA 95648
Phone (916) 645-4040
Fax (916) 645-8940

STRUCTURAL ATTACHMENT COMPLIANCE LETTER

This building has been designed for a fire sprinkler system with an equivalent weight of _____ pounds per square foot over the entire roof area. This load was used for the design of both gravity and seismic lateral resisting systems. The Structural Engineer of Record for this project has reviewed the structural drawings by _____, dated _____, and fire sprinkler drawings by _____, dated _____, determined that the loading, methods of attachment of the hangers and seismic bracing and the location of the attachment for the hangers and seismic bracing are in conformance with structural design requirements and the truss manufacturer's requirements. The fire sprinkler contractor shall be responsible for installing the fire sprinkler system per the abovementioned drawings.

Sincerely,

Signature: _____

Print Name: _____

Structural Engineer of Record Stamp:

LINCOLN FIRE DEPARTMENT

Bill Smull
Chief of Police
Fire Administrator
770 7th Street
Lincoln, CA 95648
Phone (916) 645-4040
Fax (916) 645-8940

HOMEOWNER EXEMPTION LETTER

This fire sprinkler system is designed and will be installed in accordance with the owner-builder provisions of the California Business and Professions Code, Section 7026.12, which states:

The installation of a fire protection system, excluding an electrical alarm system, shall be performed only by a contractor holding a fire protection contractor classification as defined in the regulations of the board or by an owner-builder of an owner-occupied, single-family dwelling, if not more than two single-family dwellings on the same parcel are constructed within one year, plans are submitted to and approved by the city, county, or city and county authority, and the city, county, or city and county authority inspects and approves the installation.

Sincerely,

Homeowner's Signature: _____